

## **Amendments to the Claims**

Claim 1 (previously amended - allowed) An electro-mechanical battery, comprising:

a housing;

a central core fixedly disposed in said housing, said central core having an internal raceway structure thereon;

a composite rotor enclosed in said housing around said central core, said composite

rotor configured to spin about its vertical axis in said housing, said composite rotor having a plurality of closely spaced closed-circuit embedded conductive coils, said embedded conductive coils wrapped around a first composite core, said first composite core comprising carbon fiber filaments bound in an epoxy matrix; and

one or more set of permanent magnet arrays on said internal raceway and disposed

between said composite rotor and said central core.

**Claim 2 (previously cancelled)**

Claim 3 (previously cancelled)

Claim 4 (previously amended - allowed): The electro-mechanical battery of claim 1, wherein said composite rotor further comprises a second composite core outwardly located from said first composite core and a plurality of strands of composite filaments wrapped around said first composite core and said second composite core, said second composite core comprising carbon fiber filaments bound in an epoxy matrix.

1 Claim 5 (original - allowed): The electro-mechanical battery of claim 4, wherein said plurality of  
2 strands of composite filaments comprises a first carbon filament layer and a second carbon filament  
3 layer, said first carbon filament layer wrapped around said first composite core and said second  
4 composite core in a first continuous filament spiral-wound pattern.

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6 Claim 6 (original - allowed): The electro-mechanical battery of claim 5, wherein said second carbon  
7 filament layer is wrapped around said first carbon filament layer in a second continuous filament  
8 spiral-wound pattern, said second continuous filament spiral-wound pattern applied in a counter-  
9 rotating direction to said first continuous filament spiral-wound pattern.

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11 Claim 7 (original - allowed): The electro-mechanical battery of claim 6 further comprising a third  
12 carbon filament layer wrapped around said second carbon filament layer, said third carbon filament  
13 layer wrapped around said second carbon filament layer in sequential planes radial to the vertical axis  
14 of said rotor.

15

16 Claim 8 (original - allowed): The electro-mechanical battery of claim 5, wherein said second carbon  
17 filament layer is wrapped around said first carbon filament layer in a pattern comprised of sequential  
18 planes radial to the vertical axis of said rotor.

19

20 Claim 9 (original - allowed): The electro-mechanical battery of claim 1, wherein said one or more  
21 sets of permanent magnet arrays comprises a first ring of magnets forming an upper axial magnet  
22 array, a second ring of magnets forming a central radial magnet array and a third ring of magnets  
23 forming a lower axial magnet array.

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25 Claim 10 (original - allowed): The electro-mechanical battery of claim 9, wherein each of said sets  
26 of permanent magnet arrays is configured into a Halbach Array.

1 Claim 11 (original - allowed): The electro-mechanical battery of claim 1, wherein each of said sets  
2 of permanent magnet arrays is configured into a Halbach Array.

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4 Claim 12 (original - allowed): The electro-mechanical battery of claim 1, wherein said composite  
5 rotor has a substantially teardrop-shaped cross-section.

6

7 Claim 13 (previously amended - allowed): The electro-mechanical battery of claim 1, wherein said  
8 composite rotor has an outside diameter to inside diameter ratio of approximately 2 to 1.

9

10 Claim 14 (original - allowed): The electro-mechanical battery of claim 1 further comprising a  
11 conductive coil disposed between said composite rotor and said one or more sets of permanent magnet  
12 arrays.

13

14 Claim 15 (original - allowed): The electro-mechanical battery of claim 14 further comprising an  
15 interface hub interconnecting said conductive coil to said composite rotor.

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17 Claim 16 (original - allowed): The electro-mechanical battery of claim 1, wherein said housing is  
18 evacuated prior to use of said electro-mechanical battery.

19

20 Claim 17 (previously amended - allowed): An electro-mechanical battery, comprising:  
21                   a mounting structure;  
22                   a central core disposed on said mounting structure, said core having an internal  
23 raceway structure thereon;  
24                   a composite rotor disposed around said central core, said rotor configured to spin about  
25 its vertical axis around said central core, said composite rotor having a plurality of closely spaced  
26 closed-circuit embedded conductive coils, said embedded conductive coils wrapped around a first

1 composite core, said first composite core comprising carbon fiber filaments bound in an epoxy  
2 matrix; and

3 one or more set of permanent magnet arrays on said internal raceway and disposed  
4 between said composite rotor and said central core.

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6 Claim 18 (previously cancelled)

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8 Claim 19 (previously cancelled)

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10 Claim 20 (previously amended - allowed) The electro-mechanical battery of claim 17, wherein said  
11 composite rotor further comprises a second composite core outwardly located from said first  
12 composite core and a plurality of strands of composite filaments wrapped around said first composite  
13 core and said second composite core, said second composite core comprising carbon fiber filaments  
14 bound in an epoxy matrix.

15

16 Claim 21 (original - allowed) The electro-mechanical battery of claim 20, wherein said plurality of  
17 strands of composite filaments comprises a first carbon filament layer and a second carbon filament  
18 layer, said first carbon filament layer wrapped around said first composite core and said second  
19 composite core in a first continuous filament spiral-wound pattern.

20

21 Claim 22 (original- allowed) The electro-mechanical battery of claim 21, wherein said second carbon  
22 filament layer is wrapped around said first carbon filament layer in a second continuous filament  
23 spiral-wound pattern, said second continuous filament spiral-wound pattern applied in a counter-  
24 rotating direction to said first continuous filament spiral-wound pattern.

1 Claim 23 (original - allowed) The electro-mechanical battery of claim 22 further comprising a third  
2 carbon filament layer wrapped around said second carbon filament layer, said third carbon filament  
3 layer wrapped around said second carbon filament layer in sequential planes radial to the vertical axis  
4 of said rotor.

5

6 Claim 24 (original - allowed) The electro-mechanical battery of claim 17, wherein said one or more  
7 sets of permanent magnet arrays comprises a first ring of magnets forming an upper axial magnet  
8 array, a second ring of magnets forming a central radial magnet array and a third ring of magnets  
9 forming a lower axial magnet array.

10

11 Claim 25 (original - allowed) The electro-mechanical battery of claim 24, wherein each of said sets  
12 of permanent magnet arrays is configured into a Halbach Array.

13

14 Claim 26 (original - allowed) The electro-mechanical battery of claim 17, wherein said composite  
15 rotor has a substantially teardrop-shaped cross-section.

16

17 Claim 27 (original - allowed) The electro-mechanical battery of claim 17, wherein said rotor has an  
18 outside diameter to inside diameter ratio of approximately 2 to 1.

19

20 Claims 28-47 (previously cancelled)

21

22 Claim 48 (previously added - allowed) : An electro-mechanical battery, comprising:

23 a housing;

24 a central core fixedly disposed in said housing, said central core having an internal  
25 raceway structure thereon;

26

27 RESPONSE/AMENDMENT

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1                   a composite rotor enclosed in said housing around said central core, said composite  
2 rotor configured to spin about its vertical axis in said housing, said composite rotor having a first  
3 composite core and a second composite core, each of said first composite core and said second  
4 composite core comprising carbon fiber filaments bound in an epoxy matrix, said second composite  
5 core outwardly located from said first composite core;

6                   a plurality of closely spaced closed-circuit embedded conductive coils wrapped around  
7 said first composite core;

8                   a plurality of strands of composite filaments wrapped around said first composite core  
9 and said second composite core, said plurality of strands of composite filaments comprising a first  
10 carbon filament layer and a second carbon filament layer, said first carbon filament layer wrapped  
11 around said first composite core and said second composite core in a first continuous filament spiral-  
12 wound pattern, said second carbon filament layer is wrapped around said first carbon filament layer in  
13 a pattern comprised of sequential planes radial to the vertical axis of said rotor; and

14                   one or more set of permanent magnet arrays on said internal raceway and disposed  
15 between said composite rotor and said central core.

16  
17                   Claim 49 (previously added - allowed) : The electro-mechanical battery of claim 48, wherein said  
18 one or more sets of permanent magnet arrays comprises a first ring of magnets forming an upper axial  
19 magnet array, a second ring of magnets forming a central radial magnet array and a third ring of  
20 magnets forming a lower axial magnet array.

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22                   Claim 50 (previously added - allowed) : The electro-mechanical battery of claim 49, wherein each of  
23 said sets of permanent magnet arrays is configured into a Halbach Array.

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25                   Claim 51 (previously added - allowed) : The electro-mechanical battery of claim 48, wherein each of  
26 said sets of permanent magnet arrays is configured into a Halbach Array.

1 Claim 52 (previously added - allowed) : The electro-mechanical battery of claim 48, wherein said  
2 composite rotor has a substantially teardrop-shaped cross-section.

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4 Claim 53 (previously added - allowed) : The electro-mechanical battery of claim 48, wherein said  
5 rotor has an outside diameter to inside diameter ratio of approximately 2 to 1.

6

7 Claim 54 (previously added - allowed) : The electro-mechanical battery of claim 48 further  
8 comprising a conductive coil disposed between said composite rotor and said one or more sets of  
9 permanent magnet arrays.

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11 Claim 55 (previously added - allowed) : The electro-mechanical battery of claim 54 further  
12 comprising an interface hub interconnecting said conductive coil to said composite rotor.

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14 Claim 56 (previously added - allowed) : The electro-mechanical battery of claim 48, wherein said  
15 housing is evacuated prior to use of said electro-mechanical battery.

16

17 Claim 57 (currently amended) : An electro-mechanical battery, comprising:

18                   a housing;

19                   a central core fixedly disposed in said housing, said central core having an internal  
20 raceway structure thereon;

21                   a composite rotor enclosed in said housing around said central core, said composite  
22 rotor configured to spin about its vertical axis in said housing, said composite rotor configured in a  
23 substantially teardrop-shaped cross-section, said composite rotor having a first composite core and a  
second composite core, said second composite core outwardly located from said first composite core,  
said second composite core comprising carbon fiber filaments bound in an epoxy matrix; and

1                   a plurality of strands of composite filaments wrapped around said first composite core  
2                   and said second composite core, said plurality of strands of composite filaments having a first carbon  
3                   filament layer and a second carbon filament layer, said first carbon filament layer wrapped around  
4                   said first composite core and said second composite core in a first continuous filament spiral-wound  
5                   pattern; and

6                   one or more set of permanent magnet arrays on said internal raceway and disposed  
7                   between said composite rotor and said central core.

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9                   Claim 58 (cancelled)

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11                  Claim 59 (cancelled)

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13                  Claim 60 (currently amended): The electro-mechanical battery of claim ~~59~~ 57, wherein said second  
14                  carbon filament layer is wrapped around said first carbon filament layer in a second continuous  
15                  filament spiral-wound pattern, said second continuous filament spiral-wound pattern applied in a  
16                  counter-rotating direction to said first continuous filament spiral-wound pattern.

17

18                  Claim 61 (previously added): The electro-mechanical battery of claim 60 further comprising a third  
19                  carbon filament layer wrapped around said second carbon filament layer, said third carbon filament  
20                  layer wrapped around said second carbon filament layer in sequential planes radial to the vertical axis  
21                  of said rotor.

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23                  Claim 62 (cancelled)

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27                  RESPONSE/AMENDMENT

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1 Claim 63 (previously added): The electro-mechanical battery of claim 57, wherein said one or more  
2 sets of permanent magnet arrays comprises a first ring of magnets forming an upper axial magnet  
3 array, a second ring of magnets forming a central radial magnet array and a third ring of magnets  
4 forming a lower axial magnet array.

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6 Claim 64 (previously added): The electro-mechanical battery of claim 63, wherein each of said sets  
7 of permanent magnet arrays is configured into a Halbach Array.

8

9 Claim 65 (previously added): The electro-mechanical battery of claim 57, wherein each of said sets  
10 of permanent magnet arrays is configured into a Halbach Array.

11

12 Claim 66 (previously added) : The electro-mechanical battery of claim 57, wherein said rotor has an  
13 outside diameter to inside diameter ratio of approximately 2 to 1.

14

15 Claim 67 (previously added) : The electro-mechanical battery of claim 57 further comprising a  
16 conductive coil disposed between said composite rotor and said one or more sets of permanent magnet  
17 arrays.

18

19 Claim 68 (previously added) : The electro-mechanical battery of claim 67 further comprising an  
20 interface hub interconnecting said conductive coil to said composite rotor.

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22 Claim 69 (previously added) : The electro-mechanical battery of claim 57, wherein said housing is  
23 evacuated prior to use of said electro-mechanical battery.

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1 Claim 70 (new) : An electro-mechanical battery, comprising:  
2                   a housing;  
3                    a central core fixedly disposed in said housing, said central core having an internal  
4 raceway structure thereon;  
5                    a composite rotor enclosed in said housing around said central core, said composite  
6 rotor configured to spin about its vertical axis in said housing, said composite rotor configured in a  
7 substantially teardrop-shaped cross-section, said composite rotor having a first composite core and a  
8 second composite core, said second composite core outwardly located from said first composite core,  
9 said second composite core comprising carbon fiber filaments bound in an epoxy matrix;  
10                  a plurality of strands of composite filaments wrapped around said first composite core  
11 and said second composite core, said plurality of strands of composite filaments having a first carbon  
12 filament layer and a second carbon filament layer, said first carbon filament layer wrapped around  
13 said first composite core and said second composite core in a first continuous filament spiral-wound  
14 pattern, said second carbon filament layer wrapped around said first carbon filament layer in a pattern  
15 comprised of sequential planes radial to the vertical axis of said rotor; and  
16                  one or more set of permanent magnet arrays on said internal raceway and disposed  
17 between said composite rotor and said central core.

18  
19 Claim 71 (new): The electro-mechanical battery of claim 70, wherein said one or more sets of  
20 permanent magnet arrays comprises a first ring of magnets forming an upper axial magnet array, a  
21 second ring of magnets forming a central radial magnet array and a third ring of magnets forming a  
22 lower axial magnet array.

23  
24 Claim 72 (new): The electro-mechanical battery of claim 71, wherein each of said sets of permanent  
25 magnet arrays is configured into a Halbach Array.

1 Claim 73 (new): The electro-mechanical battery of claim 70, wherein each of said sets of permanent  
2 magnet arrays is configured into a Halbach Array.

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4 Claim 74 (new) : The electro-mechanical battery of claim 70, wherein said rotor has an outside  
5 diameter to inside diameter ratio of approximately 2 to 1.

6

7 Claim 75 (new) : The electro-mechanical battery of claim 70 further comprising a conductive coil  
8 disposed between said composite rotor and said one or more sets of permanent magnet arrays.

9

10 Claim 76 (new) : The electro-mechanical battery of claim 75 further comprising an interface hub  
11 interconnecting said conductive coil to said composite rotor.

12

13 Claim 77 (new) : The electro-mechanical battery of claim 70, wherein said housing is evacuated prior  
14 to use of said electro-mechanical battery.